Mani Ramanagopal

Project Scientist at Carnegie Mellon University
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Research Goals

I am developing Vision-By-Energetics (ViBE) to realize *supersensing*: a unified paradigm for perception rooted in the physics of energy transport — spanning light, heat and beyond.

Current Appointment

Carnegie Mellon University — Pittsburgh, PA
Project Scientist, Robotics Institute — 2023 - Present
Advisor: Srinivasa G. Narasimhan

Education

University of Michigan — Ann Arbor, MI
MS & Ph.D. in Robotics — 2016 - 2022
Advisors: Matthew Johnson-Roberson, Ram Vasudevan

Indian Institute of Technology - Madras — Chennai, India
B. Tech. & M. Tech. in Electrical Engineering — 2011-2016
Advisors: Bharath Bhikkaji, Jerome Le Ny

Awards & Honors

CVPR CCD Workshop Best Poster Award	2025
IEEE RA-L Best Paper Award [J3]	2023
Robotics: Science and Systems Pioneer	2020
Towner Prize for Distinguished Academic Achievement (Robotics)	2019
Mitacs Globalink Research Internship Award	2015

Previous Research Experiences

2022–'23	**PostDoc**, University of Michigan	PI: Ram Vasudevan
2016–'22	**Research Assistant**, University of Michigan	PI: Matthew Johnson-Roberson
2015–'15	**Summer Research Intern**, Polytechnique Montreal	PI: Jerome Le Ny
2014–'16	**Research Assistant**, IIT Madras	PI: Bharath Bhikkaji
2013–'13	**Summer Research Intern**, GE Global Research	PI: Vikram Melapudi

Mentoring

Selected mentorship resulting in publications

Sriram Narayanan, CMU	[R1, C10–C12]	2023 - Present
Zeqing Leo Yuan, CMU	[R2]	2024 - Present
Akihiko Oharazawa, CMU	[C11]	2024 - Present
Spencer Carmichael, UM	[C8, J1]	2021 - 2023
Seth Isaacson, UM	[P1, J3]	2022 - 2023
Pou-Chun Kung, UM	[P1, J3]	2022 - 2023
Advaith Sethuraman, UM → Waymo	[C13]	2022 - 2023
Manohar Bhatt, UM → Magna	[C8]	2022 - 2023
Nathan Tseng, UM → Applied Intuition	[J2]	2022 - 2023
Zixu Zhang, UM → Princeton	[C14]	2018 - 2020

Teaching

Courses

Teaching a course on *Vision, Imaging and Simulation for Heat and Light*	SIGGRAPH Asia	2025
Co-developed a hands-on laboratory course on *Control Experiments using LEGO Mindstorms kits*	IIT Madras	2014
Taught freshmen students basics of programming, version control and app development.	IIT Madras	2012

Training

Eberly Center Future Faculty Program: *Teaching Inclusively, Indigeneous Pedagogies* 2025

Teaching Assistant

Control Systems Laboratory, IIT Madras	2016
Data Structures and Algorithms, IIT Madras	2015

Professional Service

Organizer

Co-organizer for NSAVP workshop at IROS	2023
Program Committee for RSS Pioneers	2021

Reviewer

Grants:	**NASA PSTAR Program (Mapping)**	2023
Journals:	RAL, RAM, T-Ro, T-CI, ToG	
Conferences:	CVPR, ECCV, ICRA, IROS	

Panels

Academic Careers Panel, UMich	2025
Center for Engineering Diversity and Outreach Pathways, UMich	2020

Theses

Thermal Infrared for Robot Vision in the Field 2022
Ph.D. Thesis, University of Michigan

Planning and Control Algorithms for Autonomous Field Robots 2016
Masters Thesis, Indian Institute of Technology Madras

Publications

† → Equal contribution

Google Scholar

Journal Articles

J1. Carmichael, S., Buchan, A., **Ramanagopal, Mani**, Ravi, R., Vasudevan, R. & Skinner, K. A. Dataset and benchmark: Novel sensors for autonomous vehicle perception. *The International Journal of Robotics Research*, 02783649241273554 (2024).

J2. Carlson, A.†, **Ramanagopal, Mani**†, Tseng, N., Johnson-Roberson, M., Vasudevan, R. & Skinner, K. A. CLONeR: Camera-Lidar Fusion for Occupancy Grid-Aided Neural Representations. *IEEE Robotics and Automation Letters* **8,** 2812–2819 (2023).

J3. Isaacson, S., Kung, P.-C., **Ramanagopal, Mani**, Vasudevan, R. & Skinner, K. A. LONER: LiDAR Only Neural Representations for Real-Time SLAM. *IEEE Robotics and Automation Letters* **8,** 8042–8049 (2023). **IEEE RA-L Best Paper Award 2023**.

J4. Kim, W., **Ramanagopal, Mani**, Barto, C., Yu, M.-Y., Rosaen, K., Goumas, N., Vasudevan, R. & Johnson-Roberson, M. Pedx: Benchmark dataset for metric 3-d pose estimation of pedestrians in complex urban intersections. *IEEE Robotics and Automation Letters* **4,** 1940–1947 (2019).

J5. Mohanan, J., **Ramanagopal, Mani**, Venkatesan, R. H. & Bhikkaji, B. Toward real-time autonomous target area protection: Theory and implementation. *IEEE Transactions on Control Systems Technology* **27,** 1293–1300 (2018).

J6. **Ramanagopal, Mani**, Anderson, C., Vasudevan, R. & Johnson-Roberson, M. Failing to learn: Autonomously identifying perception failures for self-driving cars. *IEEE Robotics and Automation Letters* **3,** 3860–3867 (2018).

J7. **Ramanagopal, Mani**, Phu-Van Nguyen, A. & Le Ny, J. A motion planning strategy for the active vision-based mapping of ground-level structures. *IEEE Transactions on Automation Science and Engineering* **15,** 356–368 (2017).

Peer-reviewed Conference Proceedings

C8. Carmichael, S., Bhat, M., **Ramanagopal, Mani**, Buchan, A., Vasudevan, R. & Skinner, K. A. *TRNeRF: Restoring Blurry, Rolling Shutter, and Noisy Thermal Images with Neural Radiance Fields* in *2025 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)* (2025), 7980–7990.

C9. Jha, R., Lenka, A., **Ramanagopal, Mani**, Sankaranarayanan, A. & Mitra, K. *RT-X Net: RGB-Thermal cross attention network for Low-Light Image Enhancement* in *2025 IEEE International Conference on Image Processing (ICIP)* (2025), 1492–1497.

C10. Narayanan, S., **Ramanagopal, Mani**, Sheinin, M., Sankaranarayanan, A. C. & Narasimhan, S. G. *Shape from Heat Conduction* in *European Conference on Computer Vision* (2025), 426–444.

C11. Oharazawa, A., Narayanan, S., **Ramanagopal, Mani** & Narasimhan, S. G. *Resolving Shape Ambiguities using Heat Conduction and Shading* in *2025 IEEE International Conference on Computational Photography (ICCP)* (2025), 1–11.

C12. **Ramanagopal, Mani**, Narayanan, S., Sankaranarayanan, A. C. & Narasimhan, S. G. *A Theory of Joint Light and Heat Transport for Lambertian Scenes* in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* (2024), 11924–11933.

C13. Sethuraman, A. V., **Ramanagopal, Mani** & Skinner, K. A. *Waternerf: Neural radiance fields for underwater scenes* in *OCEANS 2023-MTS/IEEE US Gulf Coast* (2023), 1–7.

C14. **Ramanagopal, Mani**, Zhang, Z., Vasudevan, R. & Johnson-Roberson, M. *Pixel-Wise Motion Deblurring of Thermal Videos* in *Proceedings of Robotics: Science and Systems* (2020).

C15. Zhang, J., **Ramanagopal, Mani**, Vasudevan, R. & Johnson-Roberson, M. *Listereo: Generate dense depth maps from lidar and stereo imagery* in *2020 IEEE International Conference on Robotics and Automation (ICRA)* (2020), 7829–7836.

Patents

P1. Isaacson, S., Kung, P.-C., Skinner, K., **Ramanagopal, Mani** & Vasudevan, R. *Pose generation via lidar sensor measurements* US Patent App. 18/463,733. Mar. 2025.

P2. Ravi, R., **Ramanagopal, Mani**, Vasudevan, R. & Skinner, K. *Neural radiance field for vehicle* US Patent App. 18/528,835. June 2025.

P3. Carlson, A., Jaipuria, N., Chakravarty, P., **Ramanagopal, Mani**, Vasudevan, R. & Skinner, K. *Neural radiance field for vehicle* US Patent App. 18/358,438. Feb. 2024.

P4. Melapudi, V. R., Navalgund, M., **Ramanagopal, Mani** & Sharma, P. *System and method for detecting an anomaly in a pipe assembly* US Patent 10,690,585. June 2020.

Preprints In-revision

R1. Narayanan, S., **Ramanagopal, Mani** & Narasimhan, S. G. Dual Band Video Thermography Near Ambient Conditions. *arXiv preprint arXiv:2509.11334* (2025).

R2. Yuan, Z. L., **Ramanagopal, Mani**, Sankaranarayanan, A. C. & Narasimhan, S. G. Ordinality of Visible-Thermal Image Intensities for Intrinsic Image Decomposition. *arXiv preprint arXiv:2509.10388* (2025).

Talks, Posters and Presentations

Vision with Heat and Light, Poster	ICCP	2025
Vision with Heat and Light, **Best Poster Award at CCD Workshop**	CVPRW	2025
A Theory of Joint Light and Heat Transport for Lambertian Scenes, Poster	CVPR	2024
Thermal Infrared for Robot Vision, NSAVP Workshop Invited talk	IROS	2023
CLONeR: Camera-Lidar Fusion for Occupancy Grid-Aided Neural Representations, Oral	IROS	2023
Self-driving cars, with Matthew Johnson-Roberson	NeurIPS	2022

Thermal Infrared for Robot Vision, Special seminar	CMU	2022
Thermal Infrared for Robot Vision, RSS Pioneers	RSS	2020
Pixel-Wise Motion Deblurring of Thermal Videos, Oral	RSS	2020
Failing to learn: Autonomously Identifying Perception Failures for Self-driving Cars, Oral	IROS	2018
Failing to learn: Autonomously Identifying Perception Failures for Self-driving Cars, Workshop on Continuous and Open Set Learning	CVPRW	2017

References

Srinivasa G. Narasimhan (srinivas@andrew.cmu.edu) CMU
Interim Director, U.A. and Helen Whitaker Professor of Robotics
Carnegie Mellon University

Matthew Johnson-Roberson (matthew.johnson-roberson@vanderbilt.edu) Vanderbilt
Dean (College of Connected Computing), Distinguished Professor of CS and ECE,
Vanderbilt University

Aswin C. Sankaranarayanan (saswin@andrew.cmu.edu) CMU
Professor, Electrical and Computer Engineering
Carnegie Mellon University

Ram Vasudevan (ramv@umich.edu) UMich
Associate Professor, Mechanical and Robotics Departments,
University of Michigan - Ann Arbor

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